CLAIMS:

1. A device for providing a reactant to a reaction zone in a plug flow reactor, the device comprising:

a feedblock configured to substantially encircle the reaction zone;

an inlet port providing entry of the reactant into the feedblock;

a manifold disposed within the feedblock and in fluid connection with the inlet port; and

a plurality of reactant feed ports disposed in the feedblock for delivering reactant to the reaction zone and fluidly connected with the manifold such that the reactant is delivered to the reactant feed ports.

2. The device of claim 1 wherein the plurality of uniformly distributed feed ports are disposed around the reaction zone in a substantially equidistant manner.

3. The device of claim 2 wherein the manifold is an annular chamber extending circumferentially through the main body.

4. The device of claim 1 having at least 4 feed ports.

5. The device of claim 1 having at least 12 feed ports.

6. The device of claim 1 wherein the feedblock includes a first flange portion, a mainbody, and a second flange portion wherein the central portion provides fluid contact of the feed ports with the reaction zone and the first and second flange sections provide for fluid connection with the plug flow reactor.

7. A plug flow reactor comprising:

a plug flow reactor chamber;

a reactant feedblock in fluid connection with the plug flow reactor chamber wherein the feedblock includes a plurality of substantially uniformly spaced circumferentially distributed reactant feed ports disposed to provide a reactant to the

reactor chamber and a manifold disposed within the feedblock and fluidly connected with the feed ports for distributing reactant to the feed ports.

8. The plug flow reactor of claim 7 wherein the reactant feedblock includes an inlet feed port fluidly connected to the manifold.

9. The plug flow reactor of claim 7 including a plurality of spaced-apart feedblocks disposed along the reactor chamber, wherein the reactant feed ports of each feedblock are disposed for providing reactant into the reactor chamber.

10. The plug flow reactor of claim 7 including a plurality of feedblocks disposed in an adjacent manner along the reactor chamber wherein the feed ports of each feedblock are disposed to provide reactant into the reactor chamber.

11. A method for minimizing radial variation in concentration upon entry of a reactant into a reaction zone of a plug flow reactor, the method comprising:

positioning a feedblock having a plurality of circumferentially disposed feed ports in fluid communication with the reaction zone; and

conveying the reactant through a manifold disposed within the feedblock such that reactant is fed into the reaction zone through the circumferentially disposed feed ports thereby minimizing radial variation of the reactant within the reaction zone.

12. The method of claim 11 and further including positioning a plurality of feedblocks spaced apart from each other along the reaction zone of the plug flow reactor for providing the reactant or other reactants or combinations thereof to the reaction zone through the plurality of feedblocks.

13. The method of claim 11 and further including positioning a plurality of feedblocks adjacent to each other along the reaction zone of the plug flow reactor for providing the reactant or other reactants or combinations thereof to the reaction zone through the plurality of feedblocks.

14. The method of claim 11 and further including a plurality of reaction zones in the plug flow reactor, and further comprising:

positioning a plurality of feedblocks, each feedblock having a plurality of circumferentially disposed feed ports in fluid communication with respective reaction zones; and

conveying the reactant or another reactant through the feedblocks such that the reactant or other reactants are fed into each respective reaction zone through the circumferentially disposed feed ports of the respective feedblocks thereby minimizing radial variation of the reactant or other reactants within the respective reaction zones.

15. The method of claim 1 wherein the reactant is a monomeric reactant for reacting with a polymer traveling through the reaction zone.

16. The method of claim 15 wherein the monomeric reactant reacts with the polymer to form a copolymer.

17. The method of claim 1 wherein the reactant is a monomeric reactant for reacting with an initiator to form a polymer.

18. A method for minimizing the polydispersity of polymerization reaction, the method comprising:

delivering at least one fluid into a reaction zone of a plug flow reactor monomer through a plurality of circumferentially equidistant feed ports surrounding the reaction zone; and

laterally mixing the monomer in the reaction zone for polymerization of the monomer while traveling in an essentially plug flow manner through the plug flow reactor.